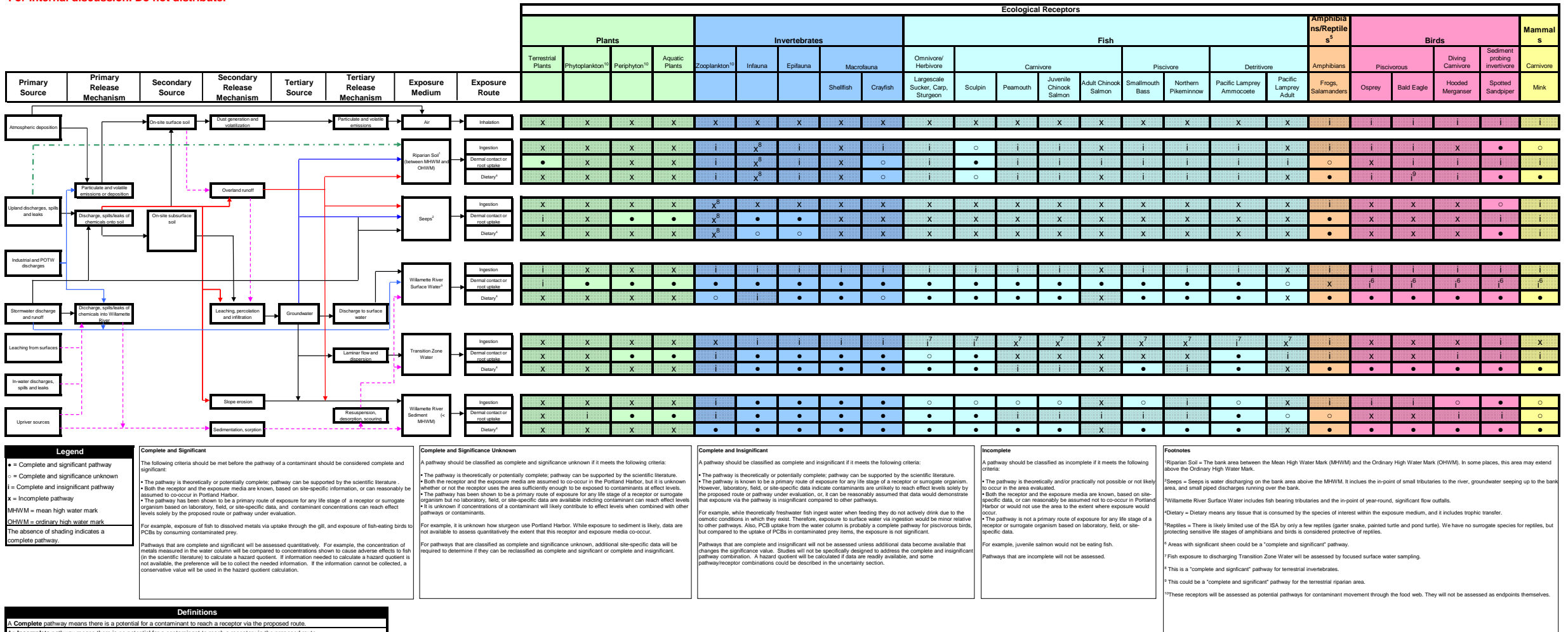


**DRAFT** Ecological risk assessment conceptual site model for the Portland Harbor Superfund Site  
For internal discussion. Do not distribute.



Definitions for Pathway Designation  
Portland Harbor NRDA

DEFINITIONS

Complete

A complete pathway means there is a potential for a contaminant to reach a receptor via the proposed route.

Incomplete

An incomplete pathway means there is no potential for a contaminant to reach a receptor via the proposed route.

Significant

A significant pathway means there is a high likelihood that a contaminant can reach effect levels via the proposed route.

Insignificant

An insignificant pathway means there is a low likelihood that a contaminant can reach effect levels via the proposed route.

Significance Unknown

Significance unknown means that it is unknown that a contaminant could reach an effect level via the proposed route. However, the contaminant might contribute to effect levels when combined with other pathways or other contaminants.

CONDITIONS FOR PATHWAY AND SIGNIFICANCE COMBINATIONS

Complete and Significant

The following criteria should be met before the pathway of a contaminant should be considered complete and significant:

- The pathway is theoretically or potentially complete; pathway can be supported by the scientific literature.
- Both the receptor and the exposure media are known, based on site-specific information, or can reasonably be expected to co-occur in Portland Harbor.
- The pathway has been shown to be a primary route of exposure for any life stage of a receptor or surrogate receptor based on laboratory, field, or site-specific data, and contaminant concentrations can reach effect levels via the proposed route or pathway under evaluation.

For example, exposure of fish to dissolved metals via uptake through the gill, and exposure of fish-eating birds consuming contaminated prey.

Pathways that are complete and significant will be assessed quantitatively. For example, the concentrations measured in the water column will be compared to concentrations shown to cause adverse effects to fish (from the literature) to calculate a hazard quotient. If information needed to calculate a hazard quotient is not available, a conservative value will be used to collect the needed information. If the information cannot be collected, a conservative value will be used in the hazard quotient calculation.

Complete and significance unknown

A pathway should be classified as complete and significance unknown if it meets the following criteria:

- The pathway is theoretically or potentially complete; pathway can be supported by the scientific literature.

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Medium

Exposure Route

Organization

| Plants             |               |            |                |
|--------------------|---------------|------------|----------------|
| Terrestrial Plants | Phytoplankton | Periphyton | Aquatic Plants |
|                    |               |            |                |

Air

Inhalation

|        |
|--------|
| EPA    |
| NOAA   |
| FWS    |
| DEQ    |
| Tribes |
| All    |

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| X | X | X | X |
| X | X | X | X |
| X | X | X | X |
| ○ | X | X | X |
| X | X | X | X |

Seeps

Ingestion

Dermal contact/Root Uptake

Dietary

|        |
|--------|
| EPA    |
| NOAA   |
| FWS    |
| DEQ    |
| Tribes |
| All    |
| EPA    |
| NOAA   |
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| ● | X | X | X |
| i | X | ● | ● |
| X | X | X | X |
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Ingestion

|        |
|--------|
| EPA    |
| NOAA   |
| FWS    |
| DEQ    |
| Tribes |
| All    |
| EPA    |

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|---|---|---|---|
|   |   |   |   |
| X | X | X | X |
| X | X | X | X |
| X | X | X | X |
| X | ● | ● | ● |
| i | X | X | X |
|   |   |   |   |

|                                   |                |        |   |   |   |   |
|-----------------------------------|----------------|--------|---|---|---|---|
| Willamette River<br>Surface Water | Dermal contact | NOAA   | X | ○ | ○ | ○ |
|                                   |                | FWS    | i | ● | ● | X |
|                                   |                | DEQ    | i | ● | ● | X |
|                                   |                | Tribes | X | ● | ● | ● |
|                                   |                | All    | i | ● | ● | ● |
|                                   | Dietary        | EPA    |   |   |   |   |
|                                   |                | NOAA   | X | X | X | X |
|                                   |                | FWS    | X | X | X | X |
|                                   |                | DEQ    | X | X | X | X |
|                                   |                | Tribes | X | X | X | X |
|                                   |                | All    | X | X | X | X |

|                          |                               |        |   |   |   |   |
|--------------------------|-------------------------------|--------|---|---|---|---|
| Transition Zone<br>Water | Ingestion                     | EPA    |   |   |   |   |
|                          |                               | NOAA   | X | X | X | X |
|                          |                               | FWS    | X | X | X | X |
|                          |                               | DEQ    | X | X | X | X |
|                          |                               | Tribes | X | X | ○ | ● |
|                          |                               | All    | X | X | X | X |
|                          | Dermal contact or root uptake | EPA    |   |   |   |   |
|                          |                               | NOAA   | ○ | X | X | ○ |
|                          |                               | FWS    | X | ● | ● | ● |
|                          |                               | DEQ    | X | ● | ● | ● |
|                          |                               | Tribes | X | X | ○ | ● |
|                          |                               | All    | X | X | ● | ● |
|                          | Dietary                       | EPA    |   |   |   |   |
|                          |                               | NOAA   | X | X | X | X |
|                          |                               | FWS    | X | X | X | X |
|                          |                               | DEQ    | X | X | X | X |
|                          |                               | Tribes | X | X | X | X |
|                          |                               | All    | X | X | X | X |

|                                      |                            |        |   |   |   |   |
|--------------------------------------|----------------------------|--------|---|---|---|---|
| Riparian<br>(Between MHW<br>and OHW) | Ingestion                  | EPA    |   |   |   |   |
|                                      |                            | NOAA   | X | X | X | X |
|                                      |                            | FWS    |   |   |   |   |
|                                      |                            | DEQ    |   |   |   |   |
|                                      |                            | Tribes |   |   |   |   |
|                                      |                            | All    | X | X | X | X |
|                                      | Dermal Contact/Root Uptake | EPA    |   |   |   |   |
|                                      |                            | NOAA   | ● | X | X | X |
|                                      |                            | FWS    |   |   |   |   |
|                                      |                            | DEQ    |   |   |   |   |
|                                      |                            | Tribes |   |   |   |   |

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| Dietary |

|        |
|--------|
| All    |
| EPA    |
| NOAA   |
| FWS    |
| DEQ    |
| Tribes |
| All    |

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| Aquatic Invertebrates |         |          |            |          | Fish                                    |           |          |                               |
|-----------------------|---------|----------|------------|----------|---|-----------|----------|-------------------------------|
| Zooplankton           | Infauna | Epifauna | Macrofauna |          | Omnivore/<br>Herbivore                  | Carnivore |          |                               |
|                       |         |          | Shellfish  | Crayfish | Largescale<br>Sucker, Carp,<br>Sturgeon | Sculpin   | Peamouth | Juvenile<br>Chinook<br>Salmon |

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| X | X | X | X | X | X | X | X | X |

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| X | X | X | X | X | X | X | X | X |
| X | X | X | X | X | X | X | X | X |
| X | X | X | X | X | X | X | X | X |
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| i | ● | ● | ○ | ○ | ○ | ○ | ○ | ○ |
| X | X | X | X | X | X | X | X | X |
| X | ● | ● | X | X | X | X | X | X |
|   |   |   |   |   |   |   |   |   |
| X | X | X | X | X | X | X | X | X |
| ○ | ● | ● | ○ | ○ | ● | ● | i | i |
| i | ● | ● | ● | ● | ○ | ○ | ○ | ○ |
| X | X | X | X | X | X | X | X | X |
| X | ○ | ○ | X | X | X | X | X | X |

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| X | X | X | X | X | i | i | i | i |
| X | X | X | X | X | X | X | X | X |
| X | X | X | X | X | X | X | X | X |
| ● | ● | ● | ● | ● | ● | ● | ● | ● |
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| x | x | x | x | x | x | x | x | x |
| ○ | • | • | • | ○ | ○ | ○ | x | x |
| x | i | i | i | i | i | i | x | x |
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|                    |                        |                                 | Amphibians/<br>Reptiles | Birds       |            |                     |                                    |
|--------------------|------------------------|---------------------------------|-------------------------|-------------|------------|---------------------|------------------------------------|
| Piscivore          |                        | Detritivore                     | Amphibians              | Piscivorous |            | Diving<br>Carnivore | Sediment<br>probing<br>invertivore |
| Smallmouth<br>Bass | Northern<br>Pikeminnow | Pacific<br>Lamprey<br>Ammocoete | Frogs, Salamanders      | Osprey      | Bald Eagle | Hooded<br>Merganser | Spotted<br>Sandpiper               |

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| Mammals   |
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| Mink      |

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